

DP-300218

REMARKS

Claims 1 – 39 are pending in the present Application. Claims 18 – 39 have been cancelled, Claims 13, and 15 – 17 have been amended, and Claims 40 – 45 have been added, leaving Claims 1 – 17 and 40 – 45 for consideration upon entry of the present Amendment.

The Specification has been amended to correct certain typographical errors as is clear from the amendment.

Claim 13 has been amended to place it in independent form. Claim 15 has been amended to correct its dependency, while Claims 16 and 17 have merely been amended for clarity and grammar.

New Claims 40 – 45 were added to further claim the present invention. Support for these claims can at least be found in originally filed Paragraphs [0015] and [0025], and in the Figure, as well as in Claims 1 and 14 – 16.

None of these amendments were made to overcome prior art and none of the amendments narrow the claims. Additionally, no new matter has been introduced by the amendments or the new claims. Reconsideration and allowance of the claims is respectfully requested in view of the above amendments and the following remarks.

Restriction Requirement

The Examiner has required restriction pursuant to 35 U.S.C. §121. The Examiner contends that: Group I, Claims 1 – 17, is drawn to a gas sensor, classified in class 204, subclass 424, while Group II, Claims 18 – 33, is drawn to a method of making a gas sensor, classified in class 156, subclass 89.12, and Group III, Claims 34 – 39, is drawn to a ceramic part, classified in class 501, subclass 55. Pursuant to MPEP §806.05(f), MPEP §806.05(e), MPEP §806.05(i), and 35 U.S.C. §121 the Examiner requires restriction between Groups I, II, and III. Applicants hereby acknowledge the election of Group I, Claims 1 – 17, reserving the right to file divisional applications on Groups II and III, Claims 18 – 39. Claims 18 – 39 have been cancelled as drawn to non-elected inventions.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 1 – 17 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which

DP-300218

Applicants regard as the invention. In particular, the insulating layer in "intimate contact" with the second electrode is allegedly unclear. Applicants contend that it is clear and that one of ordinary skill in the art would readily understand that the Figure is not drawn to scale. However, Applicants have attached hereto a proposed drawing amendment to facilitate prosecution. Support for this amendment is clear from the specification and claims as originally filed. The proposed amendments to the drawing are circled to point them out to the Examiner on the faxed copy of this Amendment.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1 – 12 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 6,350,357 B1 to Wiedenmann et al., in view of U.S. Patent No. 5,676,811 to Makino et al. Applicants respectfully traverse this rejection.

The present application teaches and claims a gas sensor comprising an electrolyte layer having disposed on opposite sides thereof a first electrode and a second electrode, and an insulating layer that is in intimate contact with the second electrode, wherein the insulating layer comprises alumina and frit.

Wiedenmann et al. teach a plate shaped sensor element. As is shown in the Figures (1 and 2), this sensor comprises a reference electrode disposed between two electrolytes (21, 25). Disposed on a side of the second electrolyte (25), opposite the reference electrode 35, is an insulating layer 50.

Makino et al. teach an air-fuel ratio detecting element with both an oxygen pump portion and an oxygen sensor portion provided on a single solid electrolyte sheet. (Abstract) Disposed between the oxygen pump portion 2 and a heating element 4 is a spacer 5 with a slit 20 forming an air passage 19. The spacer 5 has another opening 36 forming an inner space 17, with a partition 21 disposed between the opening 36 and the opening 20. (Figure 2)

In rejecting the present claims, Wiedenmann et al. are relied upon for teaching the general design of a sensor and for teaching a layer with frit, while Makino et al. are relied upon for altering Wiedenmann et al. to remove the second electrolyte.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are

DP-300218

disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

It is noted that the Office Action refers to Makino et al., (Col. 1, line 66 - Col. 2, lines 8 and 39 – 43) to support the contention that “insulating layers are both cheaper and less susceptible to leaks than electrolyte layers. Applicants respectfully disagree with this assessment of the teachings of Makino et al. Makino et al. teach many sensor designs. In the design of Figure 2 they eliminate an electrolyte that would typically be disposed between the electrodes of the oxygen sensing portion. They explain that this design makes “the overall structure simpler and reduc[es] costs of manufacturing of solid electrolyte sheets as well as costs of materials.” (Col. 2, lines 6 – 8) Makino et al. further teach (in reference to Figures 18 and 19) that “by disposing an isolating member between the solid electrolyte sheet and the insulating sheet, the reference oxygen space and the inner space can be reliably isolated from each other, whereby a leak between the spaces can be prevented.” (Col. 2, lines 39 – 43) Applicants do not deny that removal of a layer reduces the costs of those layers. However, there is no teaching that electrolytes leak or that insulating layers are cheaper. Reference to leakage was not in relation to the general electrolyte characteristics, but was in relation to a design of a spacer to prevent leakage between spaces. Makino et al. merely teach various designs. In the design where the oxygen sensor portion is disposed on a side of a heating element opposite the oxygen pump portion, the use of an isolating layer between the heating element and the oxygen sensor portion helps prevent leaks.

Wiedenmann et al. teach a specific sensor design having two electrodes and two electrolytes as set forth in Figure 2. In contrast, Makino et al. teach various sensor designs comprising both oxygen pump portions and oxygen sensing portions (four electrodes). Makino et al. teach various sensor designs having these portions. In Figure 2 they illustrate a design where a single electrolyte layer is used with all four electrodes. Disposed adjacent these

DP-300218

electrodes is a spacer that has a particular design with a partition to maintain separate openings. In this design, "the number of solid electrolyte sheets can be reduced compared with the case where the oxygen pump portion and oxygen sensor portion are constructed of separate solid electrolyte sheets, thereby making the overall structure simpler and reducing costs of manufacture of solid electrolyte sheets as well as costs of materials." They also teach that the spacer can comprise alumina. (Col. 14, lines 24 – 25)

In order to establish a *prima facie* case of obviousness, there must be both a motivation to combine in the prior art and an expectation of success. In other words, the test is what an artisan *would* do with an expectation of success, and not what they *could* do. Considering the different designs of the sensors between Wiedenmann et al. and Makino et al., an artisan *would not* modify Wiedenmann et al. as suggested by the Examiner in view of the teachings of Makino et al. Makino et al. teach various configurations of electrode/electrolyte arrangements as well as different spacer designs to accommodate those arrangements. They do not teach or address the removal of an electrolyte. Wiedenmann et al., do not discuss a system having four electrodes or the arrangement of those electrodes with respect to various arrangements of electrolytes. Wiedenmann et al. illustrate a system with two electrodes and two electrolytes. There is no teaching, suggestion, or motivation to remove the electrolyte disposed between the reference electrode and the insulating layer.

Obviousness must be determined at the time of the invention and not with the use of hindsight provided by the present invention. In order to arrive at the arrangement suggested in the Office Action, an artisan would first have to start with the sensor illustrated in Figure 2 of Wiedenmann et al. The artisan would then need to assume that the electrolyte disposed between the reference electrode and the insulating layer serves no purpose. (No motivation) The artisan would then have to remove the electrolyte. (No expectation of success) Once the electrolyte was removed, the artisan would have to insert the spacer of Makino et al. (No motivation) The artisan would next need to modify the design of the spacer of Makino et al. to meet the design of the removed electrolyte of Wiedenmann et al. and need to disregard the teaching of Makino et al. with respect to the composition of the spacer. (No motivation or expectation of success) Finally, the artisan would need to assume that the spacer of Makino et al. that now replaces the electrolyte

DP-300218

of Wiedenmann et al. should be the composition of yet another component, namely the insulating layer of Wiedenmann et al. (No motivation or expectation of success)

As stated above, determination of obviousness is not what *could* be done, but what *would* be done by an artisan, with an expectation of success. As is set forth above, there is no motivation or expectation of success, based upon the references of record, to modify one or both of these references to attain the present claims. Therefore, a *prima facie* case of obviousness has not been established, and the present claims are allowable over the art of record. Reconsideration and withdrawal of the rejection are respectfully requested.

Claim Objections

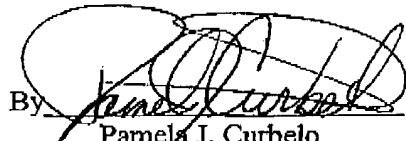
Claims 13 – 17 have been identified as allowable, but objected to for depending from a rejected base claim. Claim 13 has been redrafted in independent form with Claims 14 – 17 depending therefrom, thereby rendering this objection moot.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and withdrawal of the rejections, and allowance of the case are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN LLP

By 
Pamela J. Curbelo
Registration No. 34,676

Date: March 16, 2004
CANTOR COLBURN LLP
55 Griffin Road South
Bloomfield, CT 06002
Telephone (860) 286-2929
Facsimile (860) 286-0115